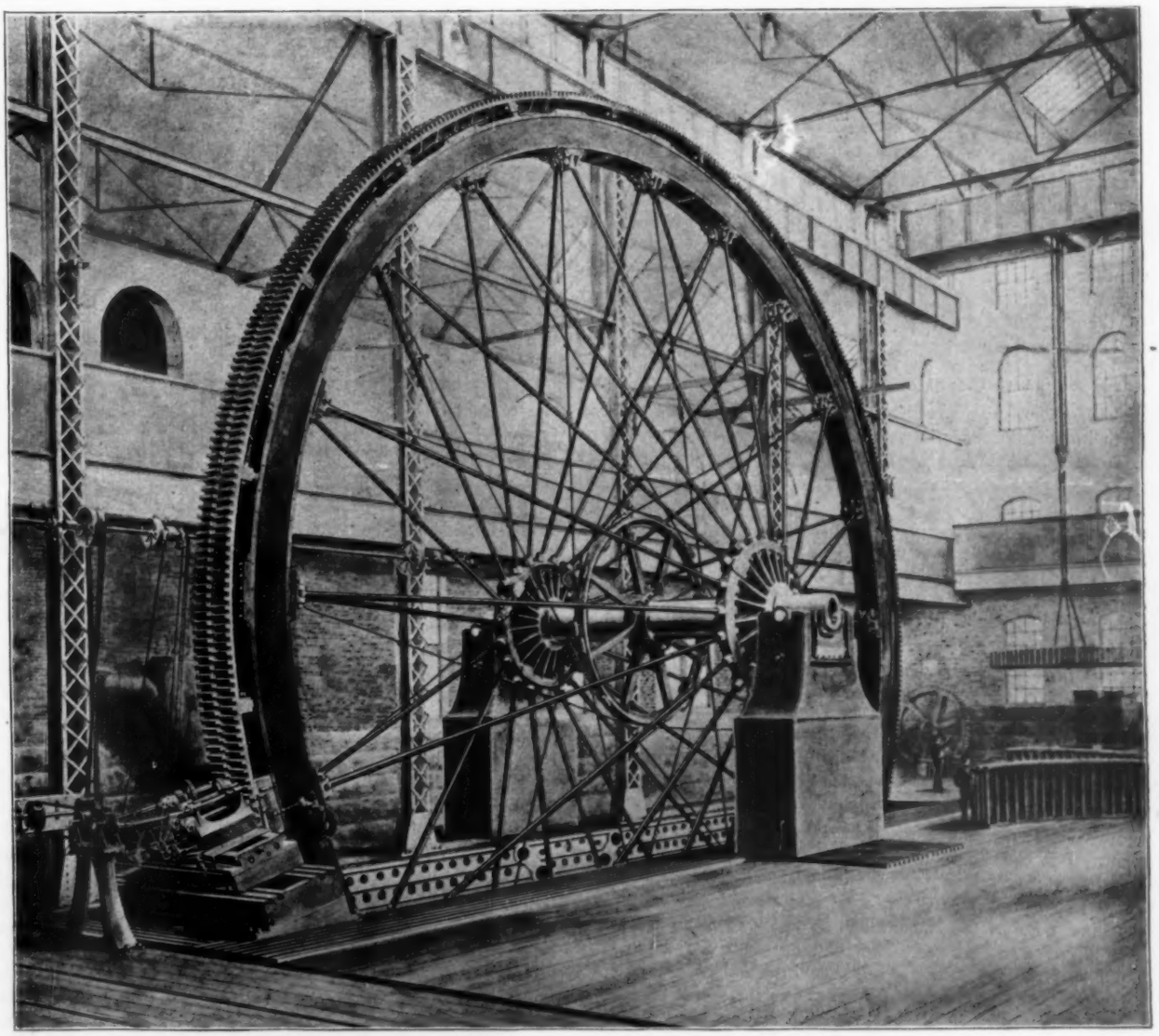
"WRITTEN SO YOU CAN UNDERSTAND IT."

POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

VOL. I. No. 14. CHICAGO, APRIL 12, 1902. PRICE 5 CENTS.

MONSTER SAND WHEEL NOW BUILDING



WEIGHT 1,000,000 POUNDS; HEIGHT 65 FEET; LIFTS 75,000,000 GALLONS WATER DAILY

IN THIS ISSUE:

Daring Feat of Bicyclist.
Electrical Experiments for Boys, Chap. 14.
Mechanical Work for Boys—Making a Lady Kite.
Pumping Mines by Electricity.
The Submarine Diver and His Work—Part I.
How Electric Heaters are Made—Part II.
Forty-Six Articles—34 Illustrations.

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SMITHSONIAN DEPOSIT.

MAMMOTH SAND WHEEL.

One of the Largest Ever Built—Operated by Electricity.

Comparatively few people have ever heard of a Sand Wheel, and still fewer have ever seen one. With the aid of photographer and engraver we bring one to our readers this week.

Our illustration on the front page shows the wheel now being erected by the Robert Poole & Sons Co., Baltimore, for the Calumet & Hecla Mining Co. Few shops in the country have the facilities for constructing such a mammoth. It is being built from the plans of the mining company's engineer, E. D. Leavitt, of Cambridgeport, Mass., and is 65 feet in diameter, weighing with its base plates and supporting columns over 1,000,000 pounds. The shaft, or axle, is made of Krupp's crucible cast steel, 32 inches diameter, 27 feet long, with a 16-inch hole bored through the center, and weighs 42,000 pounds. Journals are 25 inches diameter and 42 inches long.

Two gun iron hubs are fitted to either end of the shaft, each weighing 20,000 pounds, and from these hubs radiate forty 4-inch steel arms or spokes, which support the rim sections on the same principle as a bicycle wheel; each spoke arranged with special nuts and threads for fine adjustment when erected in place. The rim is built up in 20 segments. It consists of two concentric rings, one on the inside for strengthening the entire structure attached to the radial spokes, and another on the outside consisting of a toothed gear rim fastened to the inside rim with bolts and keys. On the periphery of the outside rim are cast staggered or stepped gear teeth, and these teeth are milled with special tools to an accuracy of one-thousandth of an inch variation. The pitch of the working teeth is 4.7 inches, each row of teeth 12 inches wide, making an effective working face of 24 inches. There are 26 teeth in each segment, or a total of 520 in the entire wheel.

To each side of the sectional rim is riveted a rectangular plate iron box, carrying on its inner side 275 buckets, 550 in all. The buckets are set at an angle which together with the periphery velocity prevents discharge until a horizontal position is reached near the top of the wheel; the distance across the face of the wheel when the buckets are fitted being about 12 feet. The lower part of the wheel dips in a shallow pit, into which the refuse from the stamp mills flows, and as it turns each bucket is filled with water, gravel or sand, and carried up to be discharged at an elevation of about 50 feet into a trough, where it is carried away by the water in sluiceways, the discharge being close to 75,000,000 gallons in 24 hours. The pinion, or small wheel by which motion is given to the large wheel, has 23 teeth in each row, and is 37 inches diameter, accurately milled to match the large wheel, and is fitted to a shaft carrying on its outer end a mortise, or wood tooth wheel, engaging with an iron pinion fitted on the motor shaft. The electric motor for driving is of 750 horse power, speed 150 revolutions per minute. The large wheel makes about four revolutions per minute, and the periphery speed at the inner edge of the buckets will be about 12 feet per second.

It is expected that the wheel will be ready for delivery in about four months, when 40 gondola cars will be required for its transportation. Our illustration shows the wheel in present stage of construction—the buckets have not yet been placed in the wheel.

Jacon Jacobson, a windlassman, fell 70 feet, down a mining shaft of the Fay Exploration company at Virginia, Minn., and escaped without broken bones.

Eight million pounds of plates and 2,225,000 pounds of channels, angles and shaped steel are being used in the construcion of two battleships, New Jersey and Rhode Island, at the Fore River ship yard, Quincy, Mass. They are to be among the largest warships in the world.

FIRST PLASTER CAST OF A LIVING WOMAN.

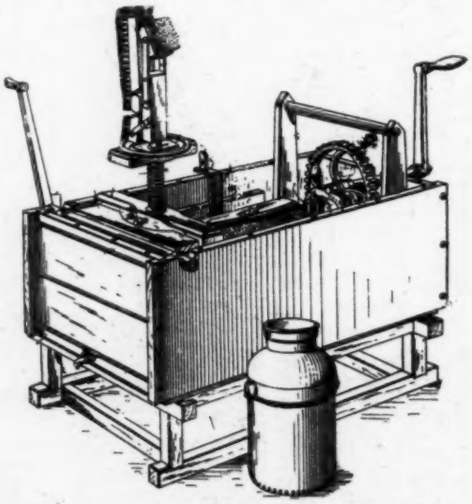
A New York model, Miss Bedella Patterson, posed for a kneeling figure of "Psyche at Nature's Mirror." She is the first woman to pose for an "entire figure" plaster cast, to serve as a model for a wax impression. The pose depicts Psyche in a recumbent position looking into a stream. It required exactly seven hours to form the mold. The trying experiment was conducted by C. Van Burn, A. Tognieri and M. Asher, three noted sculptors. Miss Patterson said:

"The only injury I sustained was a slight burn on the wrist. At first the plaster felt cold, but it soon grew agonizingly hot, and I felt that if I could get out I would never pose again."

The model of Psyche is being made by J. R. Palmerberg, 710 Broadway, N. Y. At the conclusion of the pose the girl was completely exhausted.

MILK CAN CLEANING MACHINE.

People in cities have little conception of the vast number of cans required to transport the milk product every day. There are several million of these cans and each one must be thoroughly cleaned at least once each day. On account of their



shape this is no easy matter. Richard Nelson of Moncton, Md., has invented a labor-saving machine. The can is put over a collapsible brush which is then expanded and made to revolve rapidly by means of a crank, at the same time a stream of water is forced into the can.

WOMAN MAKES BEST ATHLETES' SHOES.

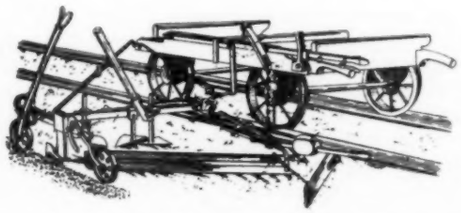
It is said that the only shoemaker in the United States who possesses the secret of making perfect racing shoes for pedestrians is a woman. She is Mrs. Frazier, the widow of "Jack" Frazier, well known during his life as an athlete, as well as a maker of racing shoes. The Shoe Trade Journal says:

"It is a curious fact that all the shoes worn by the pedestrians in the six-day go-as-you-please race at Madison Square Garden were made by Mrs. Frazier. In the old days 'Jack' Frazier fitted the leading pedestrians with their racing shoes, and before he died taught his wife the art of making shoes that would not chafe or swell the feet of a long-distance runner. Mrs. Frazier personally measures the feet of the athletes and cuts the leather for the shoes. In a race like that at the Garden a man well shod has an immense advantage over those who are not, and all the old-time pedestrians, as well as the new ones, appreciate the fact."

The area of Yellowstone park is equal to that of Delaware plus Rhode Island.

BALLAST SPREADER.

In ballasting a railroad the sand, gravel or crushed rock is dumped from the cars in piles on either side of the track. Then men with shovels spread the material out evenly or as they say



"trim" it. Here is a machine which may be set at any angle required and which is drawn by a wire rope fastened to the locomotive.

A new valve mechanism is said to have been tested on the Great Northern railroad in England with sensational results. It is claimed that it reduced coal consumption 40 per cent and that a locomotive thus fitted at 140 pounds steam will do more work than an ordinary one with 210 pounds.

Thomas A. Edison has been made an honorary member of Edison Hook and Ladder Company of Menlo Park, N. J., the truck house of which was formerly the laboratory of the inventor. It was in this house that the telephone, the electric light and phonograph were invented.

DARING FEAT OF A BICYCLIST.

Loops the Loop on His Wheel While Bewildered Spectators Look On.

Looping the loop on a bicycle is the daring feat accomplished by Robert S. Vanderwood after two others met with disaster in the hazardous attempt. In this remarkable performance Vandervoord had to ride for a short time with his head downward, seeming almost an impossibility. But it was accomplished on the same principle that passengers in an ordinary loop-the-loop car do not fall out when the car is at the top of the loop and that water does not spill from a pail when the

ON THE WAY DOWN.

pail is wheeled around rapidly. Had Vandervoord paused a fraction of a second while he was riding with his feet toward the sky and his head downward he would have fallen and probably have been dashed to death on the timbers below.

Joseph Mack, who tried the experiment several months ago, came near losing his life. He fell from the top of the loop; both his legs were broken, his ribs were smashed and he was injured internally. Harry Stewart, who made the attempt, also fell, but by a superlative effort managed to throw himself in a net that had been stretched for him and escaped serious injury.

Vandervoord's feat was accomplished at Coney Island. He

COMING OUT OF THE LOOP.

will again attempt it this summer at Chicago. He made forty practice trips before giving a public exhibition that amazed the thousands who looked on. The Coney Island structure is 200 feet long, says the Motor Age, and the time which it takes to make the trip is just 6 2-5 seconds. There is about 100 feet of incline at an angle of 30 degrees. The accompanying illustration, "On the Way Down," shows Vandercoord in the act of completing the circuit when he is going at the rate of about 35 miles an hour. When he is head down at the top he is traveling 17 miles an hour. The loop is egg shaped. The incline is 4 feet wide, narrowing at the bottom to 3 feet and widening again at the beginning of the loop to a maximum width of 12 feet.

Paderewski refuses to sleep in a sleeping car unless his head is toward the engine. This fact caused a great commotion at Davenport, Ia., a short time ago when the pianist's sleeping car had to be taken to the draw of the government bridge across the Mississippi to be turned round. This draw is the biggest turn table in America, but it was the first time it was ever used for that purpose.

The steel lower masts being built at the Fore River Ship Yards at Quincy, Mass., for the seven-masted schooner, mentioned in Popular Mechanics, March 15, are the largest ever attempted, each being 135 feet long and 31 inches in diameter.

Easy Electrical Experiments
FOR BOYS

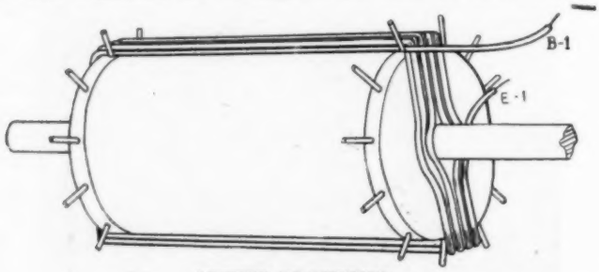
By L. P. Dickinson

CHAPTER XIV.

HOW TO MAKE A 1-20 HORSE POWER MOTOR.—WINDING THE ARMATURE.

In the last chapter directions were given for constructing the armature core. Now we will proceed to wind this core with the necessary coils of wire. The brads projecting radially from the ends of the spool are for the purpose of retaining the various coils in place upon the spool. Since we put twelve of these brads upon each end of the spool, there will be spaces between them for twelve coils of wire.

Before beginning the winding of the coils be sure that the



METHOD OF WINDING.

iron washers in the core are completely covered with a layer of paper. Also be very sure that the shaft is wrapped with heavy paper, glued on as directed. The brass screws which hold the heads of the wooden spool in place should be sunk below the surface of the wood, so that it will be impossible for a wire to touch them.

There will be needed for the armature ¾ pound of No. 18 double cotton covered magnet wire. Place it upon a reel or spool upon the work bench so that the wire may easily be unwound from it, taking care in handling the wire to keep it smooth and straight. Support the armature core, with its

SECTION OF ARMATURE.

shaft, in front of this reel of wire, by resting the ends of the shaft upon two blocks with the core hanging between them, so as to allow free access to the latter. Two or three nails driven into the blocks will prevent the shaft from slipping off.

Having made these preparations, we are ready for the winding. Begin at any one of the twelve spaces and wind the first coil in this space. The wire is wound lengthwise along one face of the core, across the other end, back along the opposite face of the core, across the other end and back to the starting point, thus passing entirely around the core lengthwise. The method of winding is clear from an inspection of the figure shown. Each of the coils when complete consists of slight turns of this kind. There will be just room enough between the projecting brads for four turns to lie side by side, so there will be two layers of four turns each. These must be wound very tightly and evenly, all kinks in the wire being smoothed out. Provide a quantity of little leather tags cut from an old shoe. Number one of these B-1, and fasten it firmly to the beginning end of coil No. 1. When this coil is finished—that is, when the whole eight turns are evenly wound—cut it off, leaving about six inches for connecting, and tag this end E-1, signifying that this is the end of coil No. 1. Then twist the two wires together temporarily. Proceed then to wind coil No. 2, tagging its ends B-2 and E-2. Coil No. 2 may be wound best in the space to the right of that occupied by coil No. 1. Proceed in this manner with the rest of the twelve coils.

Since each coil reaches around to the opposite side of the core, when six coils are wound all the spaces will have wire in them. But this need cause no trouble. Start to wind coil No. 7 on top of coil No. 1, but begin on the opposite side of the core; that is, coil No. 7 is wound in the space where it would naturally fall, without any notice being taken of the fact that it is wound outside of No. 1. Similarly, coil No. 8 is wound over coil No. 2, but starts on the opposite side of the core.

Of course, where all these wires overlap on the end of the spool, there will be formed a large bunch of wires. But this will do no harm provided great care is used to prevent a bare wire from touching its neighbor or the shaft. If the latter is protected with paper, there will be no trouble. Do not, however, allow the ends of the coils to form a bunch which extends more than one inch from the ends of the spool.

Twelve coils should be wound, very smoothly and evenly, and the ends properly tagged, so that when we come to connect up the coils later we can distinguish the projecting ends of one coil from those of its neighbors.

If the core has been mounted upon the shaft as directed, the shaft will project 3 inches from one end and 2 inches from the other. The winding should begin at that end of the core where the shaft is the longest.

TO RECOVER SUNKEN PALACES OF A KING.

Lake Nemi, Italy, is to be drained, in the hope of recovering the magnificent floating gardens, or houseboats, built by the crazy Emperor Caligula, forty years after Christ. A company with a capital of $100,000 has been organized for the purpose. It is headed by Signor Borghi, who made a previous attempt to recover the palaces with grappling irons and took out many decorations of bronze and marble that are almost invaluable.

Caligula squandered $100,000,000 that had been left him by Tiberius. The floating gardens of cedar wood he had built to gratify one of his fanciful whims. They were equipped with jewel prows, rich sculpture, vessels of gold and silver, bathrooms of alabaster and bronze. The gardens were places of amusement and temples in which the crazy monarch worshiped himself. The floors were paved with glass mosaic, the window and door frames were of bronze, and many of the decorations were of almost priceless value. The floating palaces, says William E. Curtis, were attached to the shore by chains. The palaces lie in the mud about 200 yards distant from each other in thirty feet of water. Several efforts have been made to recover them.

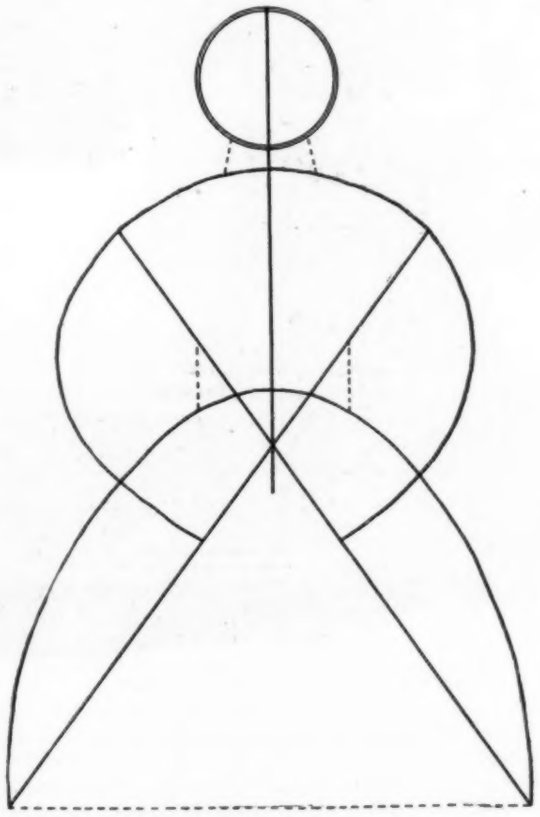
Cotton experts of Germany will send a commission to the United States to study cotton growing with a view of introducing its cultivation into German East Africa.

HOW TO MAKE A "LADY KITE."

The "lady kite" is made on the same principle as the "boy kite" explained in our issue of March 29.

The frame may be made exactly as the boy kite and then "dressed" with tissue paper to represent a girl or it may be made as in Fig. 1 of the acompanying illustration. Remember the dotted lines represent the strings or thread and the other lines indicate the kite sticks. Be careful with your measurements so that each side of the kite corresponds exactly and is well balanced. Also see that every point where the sticks intersect is firmly tacked and bound.

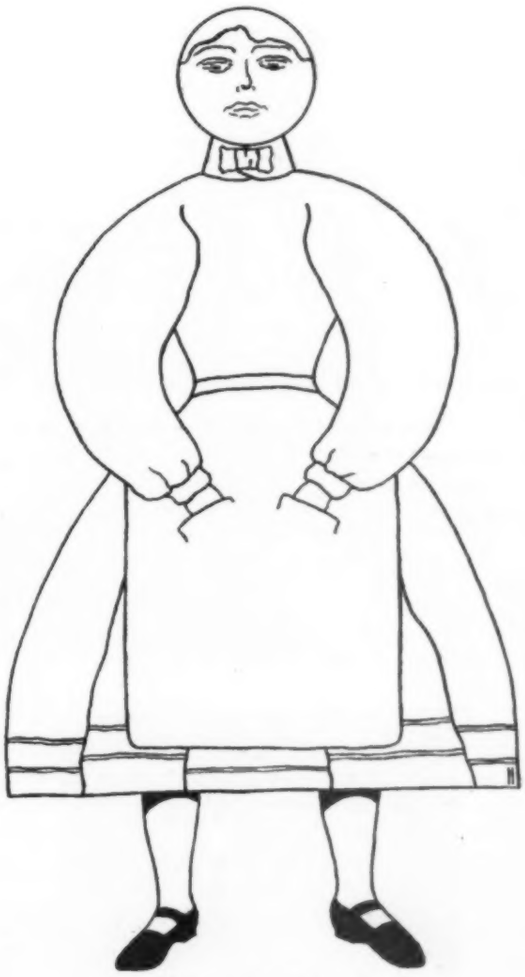
To cover the kite use tissue paper of different color. First paste together pieces of paper of different color to suit your taste. The paste should be made of flour and water and boiled. Make the seams or overlaps not quite one-third of an inch wide. Lay the paper on the floor using weights to hold it down smoothly, and place the frame of the kite upon it.



THE FRAME.

Then cut out the paper around the frame, leaving an edge of ½ inch. Don't forget to make a slit in this edge every six or seven inches and at each angle. Around the head the slits must be not more than three inches apart. This is to prevent the paper from wrinkling when it is being pasted. Put the paste on with a small brush. Cover the margin one section at a time, turn it over and press it down with a rag. Now wait until the kite is dry, after which you may paint the face, hands, head, feet and dress to suit your fancy.

To make the breast band, punch holes through the paper one upon each side of the leg-sticks, just above the bottom, and one upon each side of the arm sticks at the shoulder. Run one end of the string through the hole at the bottom of the left limb and tie it to the leg stick; tie the other end at the right shoulder. Fasten one end of another string of the same length at the bottom of the right leg; pass the string up across the first band and tie the other end at the left shoulder. Attach the kite string to the breast band at the point where the two strings intersect. Tie the knot so that you can slide



THE KITE COMPLETE.

the kite string up or down until it is properly adjusted. The tail band is made by tying a string to the leg sticks at the bottom of the breast band. Let the string hang slack below the skirt and attach the tail to the center. You can make the lady look as if dancing and kicking in the clouds by making the feet of stiff pasteboard and allowing them to hang loose from the line which forms the bottom of the skirt. The feet will move and sway with each motion of the kite.

SAYS CLEOPATRA WAS A PHYSICIAN.

Was Cleopatra a physician? Zervos has unearthed old document, says the Journal A. M. A., to prove that she was the author of several works on medical subjects. They show a thorough understanding of the theme, he remarks, rare powers of observation and enviable conciseness of statement. She lived at the time the Alexandria school was at the zenith of its fame and may have taken a medical course there. It only required six months. She killed herself, according to Galen, in the most scientific manner by having an asp's poison poured into a wound in her arm. She also embalmed Antony's body with a dexterity showing great anatomical knowledge. Zervos refers also to several Latin works dating from 1586, 1597 and 1612, which quote from her writings.

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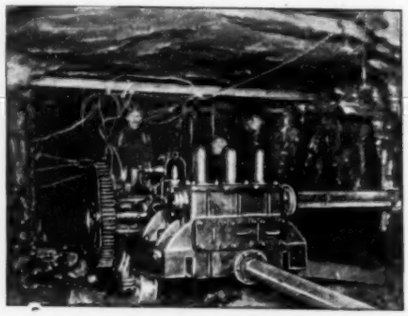
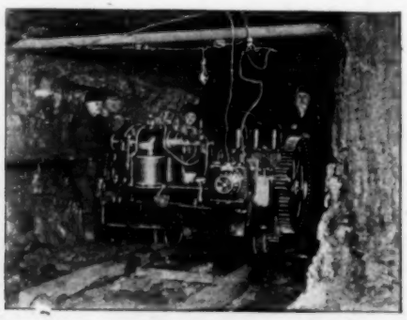
PUMPING MINES BY ELECTRICITY.

Very few mines but have trouble with water; the deeper the mine the greater the amount of water as a rule. To get rid of this water pumps must be kept going night and day. Even



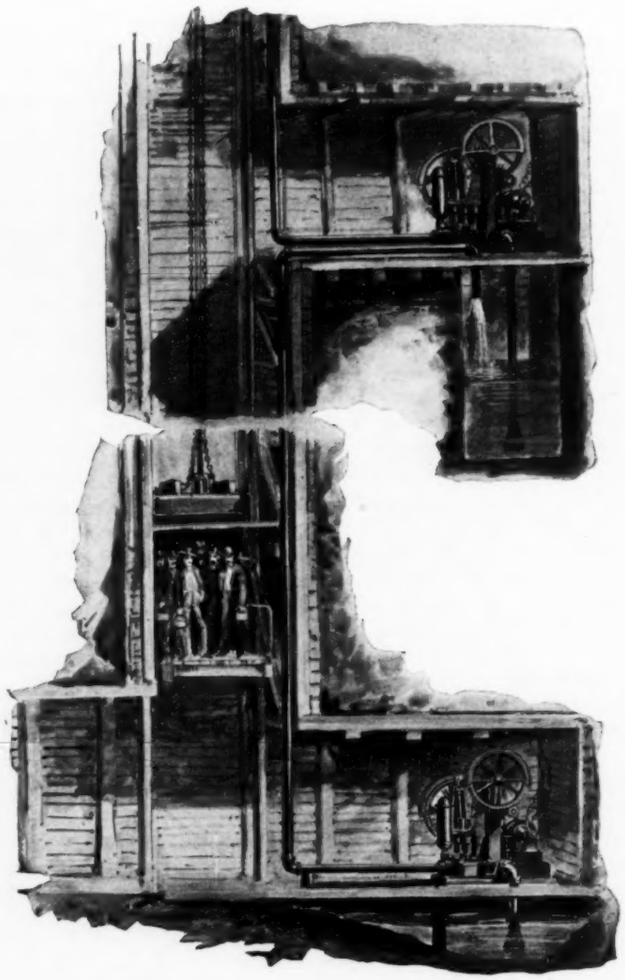
PORTABLE PUMPS CONNECTED.

then the water sometimes comes in faster than it can be pumped out, and work must stop until it is safe to proceed. There have been cases where two years have been spent pumping out a mine which had been filled with water.



EMERGENCY WORK.

The old way was to pump by steam from boilers on the surface. The loss in power in piping this steam down to the pumps 500 feet, 1,000 feet, or more, is very great. It was also necessary to have an engineer on duty all the time down in the mine to watch the pumps. Now the pumps are operated with electric motors with power conducted from the surface through a copper wire covered with waterproof material. We illustrate this, showing the system devised and built by the Gould Company, Seneca Falls, N. Y. The large cut shows



DEEP MINE PUMPING WITH ELECTRICITY.

the system of raising water from great depths. The pumps are placed at several levels and each set raise the water two or three hundred feet until it finally reaches the top and flows away. By the electric system portable pumps on cars can quickly be sent to any part of the mine and power supplied by stringing a wire, which can readily be done, and the water discharged through iron pipes or ordinary fire hose. In parts of mines which require pumping at certain seasons only, the wires and pipes are allowed to remain and the pumps and motor attached when needed.

BEST PAPER OF THE TWENTIETH CENTURY.

Nicholas Ferrigno, Hurricane Island, Maine, writes: "Inclosed find remittance for which send me your paper one year. You can tell the people that Popular Mechanics is the best paper of the twentieth century; good enough for everybody, and especially for those who are mechanically inclined."

Capitalists represented by Cornelius S. Palmer of Chicago, will establish a packing house at Uruapam, Mexico.

SCHOOL FOUNDED BY PAUL REVERE.

Important improvements are soon to be made at the Trade school of the Massachusetts Charitable Mechanic Association, founded by Paul Revere. The night sessions will probably go into effect this year and other departures are to be made, by which the college will be operated on a larger scale than ever before.

PUPILS AT WORK IN THE SHOPS OF THE M. C. M. A. TRADE SCHOOL.

Here pupils are taught the manual arts that are making America great. Bricklaying, carpentering and plumbing are included in the course of study. Graduates from a two-years' course are fitted to apply for a journeyman's license and are capable of holding positions in advance of many older heads who have spent much of their lives in practical experience. They know not only how but why. The school, says Domestic Engineering, furnishes each pupil with bench tools, furnace and all necessary material at the nominal cost of $15 per term —less than one-half the actaul cost to the association.

TALKING MACHINE AS POLITICAL ORATOR.

Chicago Candidates Have Phonograph to Do Their Speech Making While They Mix With Voters.

In Chicago where it is often necessary for a political candidate to make a dozen or more speeches during the day, going from one hall to another from morning until night, the latest improved phonograph has come to his assistence in a time most opportune. Now the candidate may remain at home in his easy chair or be passing cigars around in the audience while the phonograph is making his speech. It relieves the candidate of the purely mechanical work of delivering the talk and gives him time to circulate among the voters. The phonograph used in making these speeches is a new patent which speaks the words loudly and distinctly. The machine is "loaded" in advance so that the speech-making is interspersed with band music, and pauses are made on the film after each illusion to "that noble emblem," "a government for the people, of the people and by the people," "the land for which our fathers bled," etc., in order to give the audience time to applaud. The talking machine, as a vote getter, is the birth of the present heated city campaign. It was put into use by Alderman William Butterworth and Cassius O. Smith, republican nominees for aldermen, and proved so successful that its use is becoming quite universal in the Windy City.

NEW GUN THAT SHOOTS 25 MILES.

New York, which long has been considered impregnable, because of the Sandy Hook and Coney Island batteries, might now be destroyed by a new and sensational piece of artillery which has been invented by an American. This gun with a caliber of only 4½ inches sends a steel shell weighing 550 pounds 24 miles with a velocity of 3,900 feet a second. It is the improved Brown regimental wire-tube gun; rapid fire and perfected after 15 years. Col. James S. Ingalls, U. S. A., retired, the well known authority on ordnance building, is authority for the effectiveness of this new weapon. The range and energy of the gun are attained by using a comparatively big powder chamber, together with a long barrel, and a special carriage has been designed to stand the recoil that comes from firing the gun at an angle of 40 degrees. The gun weighs only four tons and takes a charge of 26 pounds of smokeless powder. The tube and foundation are of curled steel 1-7 inch thick. Ten miles of wire are wound into one gun, giving a tube that will stand the heretofore unheard of pressure of 92,000 pounds to the square inch.

DEADLY SANDSTORM OF AMERICAN DESERTS.

Digging out railroads from under snow slides of the Rocky mountains is easy work compared to shoveling through sands which the storms frequently pile upon the railroads crossing the American deserts. In this work a snow plow is useless. Steam shovels are used but often the hand shovel is the only weapon that can successfluly combat against these formidable sand banks.

The Arabian simoon is not deadlier than the sandstorm of the Colorado desert. Express trains cannot make head against it, and sometimes they are blown from the track. Upon the crests of some of the ranges are hundreds of acres buried deep in the fine white sand that these fearful gales scoop up by carloads from the plains and lift on high to fling upon the scowling peaks thousands of feet above. Man or beast caught in one of these sand laden tempests has little chance of escape. The man who will lie with his head tighly wrapped in coat or blanket and stifle there until the fury of the storm is spent may survive. There is no facing or breathing that atmosphere of alkaline sand, whose lightest whiff inflames eyes, nose and throat almost past endurance.

LOCOMOTIVES OF A CENTURY

[Being an illustrated history of locomotive invention, building and progress. The facts are taken from a paper by S. M. Vauclain, read before the New England Railroad Club. The illustrations were gathered and engraved by the Baldwin Locomotive Works, by whose permission they are used.—Editor P. M.]

THE WORLD'S FIRST LOCOMOTIVE.

On March 24, the locomotive was 100 years old. On that day 100 years ago Richard Trevithick and Andrew Vivian applied to the English government for a patent for steam engines for propelling vehicles, as told in Popular Mechanics, March 1 last. This was the first high pressure locomotive.

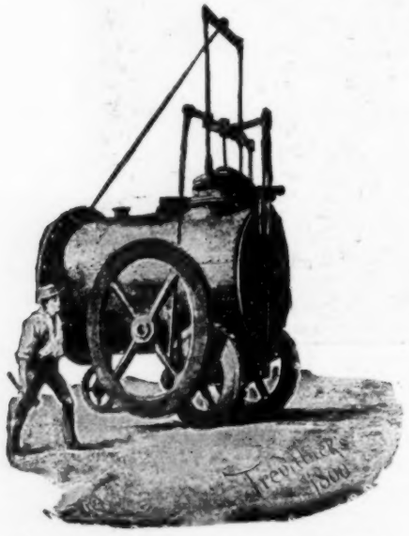


FIG. 1—TREVITHICK'S MODEL, 1800.

Mr. S. M. Vauclain, in a paper before the New England Railroad club, states that Trevithick's first model (Fig. 1) was made in 1800. Prior to this we had the creations of Newton, Cagnot, Murdock, Nathan Reed of Salem, Mass. (the first

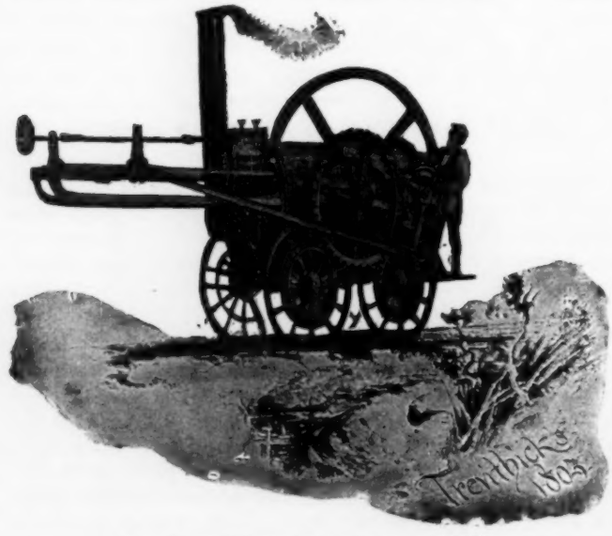


FIG. 2—TREVITHICK'S LOCOMOTIVE, 1803.

in America), and others, but their machines were all of locomobile species. In 1803 Trevithick produced the first locomotive in the world to run on iron wheels (Fig. 2). In 1804, an American, Oliver Evans, of Philadelphia, produced a locomotive which, also, was really a locomobile (Fig. 3) and was not a success.

An example is shown in Fig. 4 of an attempt to increase

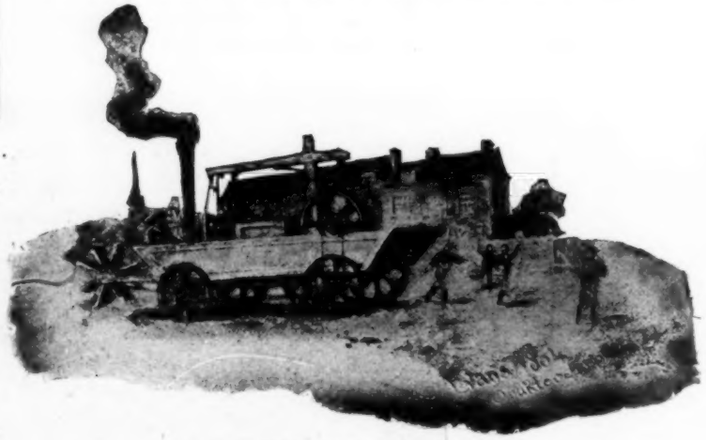


FIG. 3—OLIVER EVAN'S MODEL, 1804.

the tractive power of the locomotive—the invention of Brunton in 1812. We thus record the first effort to improve, by complication, the hauling power of the locomotive—an ignis

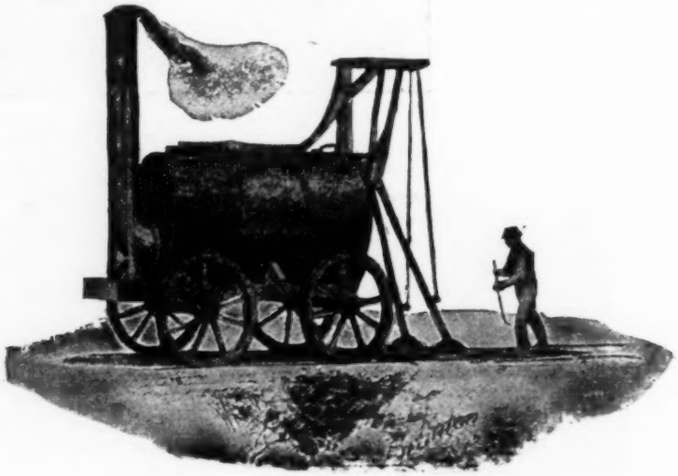


FIG 4—BRUNTON'S MODEL, 1812.

fatuas which has proven the financial ruin of many well known inventors of the nineteenth century. The next most noticea-

FIG. 5—SEGRIM'S LOCOMOTIVE, 1827.

ble advance was made by Segrim in 1827 (Fig. 5), and represents the first application of the multi-tubular boiler, the standard locomotive boiler of the present era.

(To be continued.)

INVENTORS' ASOCIATION.

On December 12th last there was organized in Chicago an association which means much to the mechanical interests of the country and to those who are working and bringing out new mechanical problems of use and value. Among its objects are: to assist deserving inventors in securing needed information and money; to assist in patenting worthy devices where assistance is needed; an exchange of ideas between members; to bring inventors who have marketable patents in touch with manufacturers who are looking for good articles to manufacture. Also to maintain a meeting room with library, and exhibition rooms in Chicago and other cities for displaying models, drawings, etc., belonging to the members. Before being admitted to the association, the member must convince the examing board that he has actually invented something.

Meetings are held each month and at each meeting the program which is of great interest, includes a lecture or address by some eminent patent attorney. This course of lectures alone is highly instructive and valuable. The public are admitted to the lectures without charge. The association has been very carefully planned and brings together each month a large number of practical men. The "crank inventor" is not encouraged to join. The officers are: President, Wm. Bennett Moore; vice-president, Ira D. Perry; secretary, Herbert E. Speyer; and treasurer, W. W. Crowe. About 100 members have already been admitted and the association is growing rapidly. We shall have more to say of its work a little later.

LAW POINTS FOR EMPLOYER AND EMPLOYED.

(Carefully compiled from the latest decisions of the highest courts.)

The duty of an employer to instruct an employe as to the danger of operating a machine does not exist as to dangers so obvious that the employe is as familiar with same as is his employer. (86 N. W. Rep., 178.)

Where an employer furnishes sufficient tools and appliances with which to carry on the work, he is not liable for an injury to an employe which was caused by the failure of a fellow-workman to make proper use of such appliances. (49 Atl. Rep., 91.)

The employer owes an obligation to his employes not to place incompetent or unskillful foremen over them. (38 S. E. Rep., 911.)

Where there is a comparatively safe and a more dangerous way known to an employe, by means of which he may discharge his duty, it is negligence for him to select the more dangerous method, and he thus assumes the risk of the injury which results. (108 Fed. Rep. 747.)

Where the employer is notified by a workman of a defect in machinery furnished for the latter's use, and promises to remedy the defect, the workman by continuing the use of the machinery for a reasonable time after the promise to repair does not assume the risk, and if by reason of the defect the employe is injured within the time, the employer will be liable. (62 S. W. Rep. 1124.)

The statement by the foreman that he intended to move the machinery slowly was not a promise of assurance that the defects would be cured or dangerous places made safe. (108 Fed. Rep. 751.)

ELECTRICITY FIRES NEW YACHT CANNON.

The latest swell thing in the yachting line is a rapid fire saluting cannon which the owner or captain fires from the bridge or any other part of the vessel by simply touching a button. To the uninitiated observer who sees and hears the piece fired at the right moment but without any one near, the

operation is a mystery. The cannon is designed and built by the Naval Electric Co., New York, which has adopted the Hotchkiss naval pattern base. The piece when mounted on a yacht has a very business-like appearance, and can when required be loaded with light shrapnel. The moment the anchor is let go or raised is the correct time to salute and not after the boat has swung to the tide. By this method the discharge is instantaneous and may be accomplished from any part of the boat.

WHEN P. T. BARNUM WAS A DENTIST.

Laughing Gas First Brought Into General Use Through the Efforts of His Firm.

Dr. W. A. Roddy of St. Louis gives an interesting description of the discovery of nitrous oxid gas for dental work. It was first used for alleviating pain by Sir Humphrey Davy. Dr. C. Q. Colton, while delivering a chemical lecture in Hartford, Conn., Dec. 10, 1844, administered the gas to ladies and gentlemen on the stage to illustrate its effects on the human system. In the audience was Dr. Horace Wells, a noted dentist. During the exhibition a young man to whom the gas had been administered became greatly excited, performed sundry evolutions and badly catused and abrased his shine against the benches. When the effects were over he declared he had felt no pain. Dr. Wells determined to test the gas by having one of his own teeth extracted. A large molar was removed and when the doctor recovered he exclaimed: "New era in tooth-pulling; didn't hurt as much as a prick of a pin."

The use of the gas slumbered until 1863, when P. T. Barnum, the great showman, became interested in its possibilities, and the Colton Dental association was formed at New Haven, Conn., consisting of G. Q. Colton, P. T. Barnum and Dr. John Allen. The association established branch offices in all the large cities.

Note—The next issue will contain an article on "How Nitrous Oxid Gas Is Made and Used."

PRIZES FOR ALCOHOL MOTORS.

The German ministries of war and agriculture make an offer for first, second and third prizes of 10,000 marks, 5,000 marks and 2,500 marks respectively, for the best alcohol motors for military usages. These motors must be made in Germany. They are to weigh less than eight tons and must be capable of drawing sixteen tons on good roads. The motor of itself must be able to cross meadows, plowed lands and water eighteen inches deep. The tires may be twenty inches wide. According to the terms of the offer, these machines must be ready to be tested in February, 1903.

The offer is a result of the initiative of Emperor William, who has long been interested in alcohol motors and engines for the transportation of military supplies and the moving of artillery.

German farmers are interested in the idea because alcohol is made from potatoes.

DANGER IN WATER KEPT IN ROOMS.

Here is something everyone should know. A peculiar property about ice-cold water is that it attracts to itself a large quantity of the poisonous gases that are exhaled through our lungs and pores. The colder the water the greater its capacity for holding impurities, and water which has stood during the night in a close bedroom is highly injurious to drink. At a normal temperature a pitcher of water will under these circumstances probably contain in the morning from a pint to a pint and a half of carbonic gas and a larger proportion of ammonia; when nearly at freezing point its capacity for imbibing poisons is doubled.

VENTILATION THROUGH WALLS.

The air of heated rooms is changed quite rapidly through the walls in cold weather, says Domestic Engineering. More than twenty years ago Flugge estimated that this "spontaneous ventilation" would completely renew the air of small rooms every hour when the difference between inside and outside temperature is 25 degrees Fahrenheit; but a somewhat slower rate has been obtained since by H. Wolpert in measuring the hourly diminution of an excess of carbonic acid in an unoccupied room. In a room of 2,000 cubic feet, with painted walls, the passage of air per hour for each degree of temperature difference was somewhat less than one-hundredth of the total air of the room. But the rate was considerable greater with masonry walls covered with paper, and three times as rapid with ordinary whitewashed walls.

ELECTRIC HEATERS.

Last week we studied the theory and examined the structure of electric heaters employed in heating street cars. These examples were selected on account of their number and because most of our readers have seen and enjoyed them. The same application of heating, put up in different shapes and made as ornamental as desired is already used to some extent in heating houses, bath rooms and offices. It is the ideal heat, less troublesome to start than

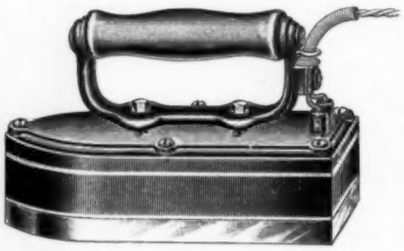


FIG. 1—MERCHANT TAILOR'S IRON.

a gas jet, and absolutely without any smell or dirt, yet at the present price of current it is a good deal of a luxury, although entirely practical from a mechanical standpoint. The time is coming, however, when the cost of current will be greatly reduced and then electric house heating will be common. There is enough power going to waste every day in the movement of the tides to heat the country, not to mention the waste power to be had from un-

FIG. 2—HATTER'S IRON.

used waterfalls and dams, the wind and other sources of power.

While extensive house heating is limited, as yet, the smaller applications are not, and in the mechanical and industrial arts electricity has proved of the greatest importance. By its use a positively uniform

FIG. 3—SINGLE HEAT.

temperature can be maintained. There is no overheating and cooling as is the case where the instrument is heated in one place and used in another.

For instance take the soldering iron. By the old charcoal stove method a great deal of time was wasted in getting a desired

FIG. 4—WITH REGULATION.

heat, then cleaning the iron; meanwhile the stove made gas, ashes and heat, all of which were very undesirable and to an extent dangerous to health and property. Now the solderer can use the same iron as many hours as he will. The electric current steadily flows into it keeping just the proper heat; until, his work done, he turns off the current.

The American Heater Co., Detroit, have

FIG. 5.

gone into the manufacture of a great variety of heaters. We illustrate a few of them to give an idea of the scope of use, construction and utility.

Take flat irons for instance. These are made in great variety for use in private house, hotel or laundry. Then there are the polishing irons such as hatters use; corset irons; bust block irons, and several types for the varied needs of tailors. Fig. 1 shows a merchant tailor's standard iron.

FIG. 6.—CURLING IRON.

These weigh from 12 to 30 pounds each. Fig. 2 is a hatter's iron weighing 4 pounds. In all these irons the heat is made to go down toward the flat face of the iron which does the work. A person can iron all day with the same iron without loss of a moment's time. Flat irons cost from $6 to $9 for house use, and from $8 to $20 for manufacturer's work.

In small portable stoves there are many

styles ranging all the way from a small one to heat milk for the baby in the night up to good sized foot warmers. Fig. 3 is a small one three inches in diameter and five inches high. Fig. 4 is the same style but larger and has a heat regulator. The vessel to be heated is set on the flat disc which forms the top of this miniature stove. Fig. 5 is another style. These cost from $4 up.

The ladies have complained many times when at a hotel on finding the gas

FIG. 7.

FIG. 8.

cut off, and no means at hand to heat the curling iron. Heaters for curling irons are now made in great variety, some very small to be put in the travelling bag and connected to any electric light fixture. Figs. 6, 7 and 8 show some of these. There is a kind now being made for hotel use to be kept fastened to the wall. When the curling iron is inserted the current is automatically turned on, and cut off again the instant it is withdrawn. A good curling iron heater costs $3.

Then there are the pancake griddles, toasters, broilers, plate warmers, foot warmers, and electric glue pots and sealing

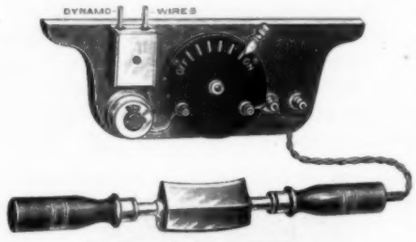


FIG. 9—SHOE IRON.

wax heaters. There are also heaters for use in surgery and hospitals.

Heat seems to enter into the manufacture of almost everything; even a pair of shoes must be ironed before it is ready to ship. In this work a very little difference

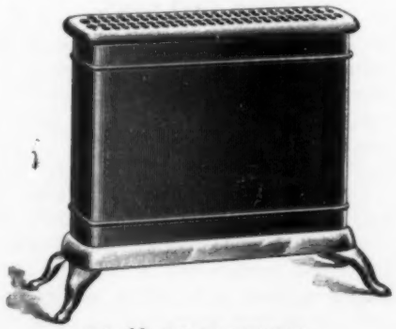


FIG. 10—HOUSE HEATER.

in temperature, either too hot or too cold, may spoil the job. In Fig. 9 we show one of these shoe ironing tools with the controller which enables the operator to secure six changes in heat from barely warm up to a heat that would quickly burn if not deftly handled. There are heaters for boots, another kind for shoes and another for more delicate foot wear. The practical utilities to which electric heating is applied are already extensive.

HOW TYPHOID FEVER SPREADS.

Turner, as medical officer of health of the Transvaal, argues against the air-borne theory of typhoid. He does not deny its possibility, but thinks that it is not usual or even frequent. As regards flies, he holds a similar opinion. He gives his observations to show that the typhoid in South Africa is almost entirely due to polluted water, says the Journal Am. Medical Assn.

The filters sent out for the troops, he claims, were not used or quickly got out of order and the soldiers continually violated hygienic laws in drinking from filthy water-holes and other polluted supplies. Quill, the ramy medical officer of Ceylon, takes the opposite view, and gives data that were obtained by him in a large camp formed at Diyatalawa in Ceylon for Boer prisoners of war. Here they are kept under discipline and all possibilities of water-borne typhoid guarded against so that this cause of the disorder can be excluded. He maintains that the infection there was air-borne, resulting from emanations from specifically infected latrines, infected dust, or bacilli-laden flies.

LIFE INSURANCE COMPANY PUZZLED

The manager of a life insurance company in Philadelphia has received the following letter from a policy-holder: "I hold a policy in your company for $20,000, on which I have paid the yearly premiums. I now have to inform you that my physician advises me that I have a pronounced case of appendicitis and his diagnosis is confirmed by a specialist whom I have consulted. I am told that the only hope of saving my life is an operation, which, with hospital expenses, will cost $800, an amount that I have no means to pay. I am sensible that I owe it to you, who have so large a pecuniary interest in my life, to give you the option to pay the cost of this operation to save my life that I may continue to pay you the yearly premiums on my policy (I believe that I am otherwise strong and healthy), or in the alternative to pay the $20,000 to my beneficiary within a few weeks. I am quite willing to be examined by any physician you may name and to have you select the operating physician. Immediate attention to this is, of course, imperative."

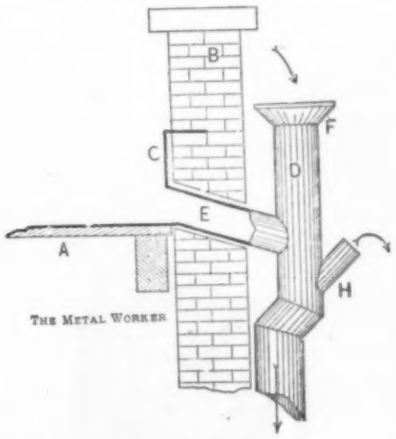
A conference of the company officials has been called to determine upon a reply.

TENANT FARMING.

One of the striking things shown by the last census is the remarkable increase of tenant farming. The percentage of farms operated by tenants showed a considerable increase by the census of 1890. For the whole country, this percentage has increased in the last ten years nearly twice as fast as the percentage of population of the nation, four times that of the purely agricultural population, and twice that of the farms operated by their owners.

THAWING FROZEN LEADERS.

A difficulty often experienced at this time of the year is keeping leaders clear of ice. Where the gutter is connected directly to the leader it is an easy matter to clear the ice in the pipe by means of rock salt and hot water, says the Metal Worker, but where a tube passes through the wall or any other part of a building, and an elbow is the result, it can be accomplished as follows: Referring to the accompanying sketch, let A represent the roof, B the parapet wall and C the flashing connecting with the tube E, which joins the leader D.



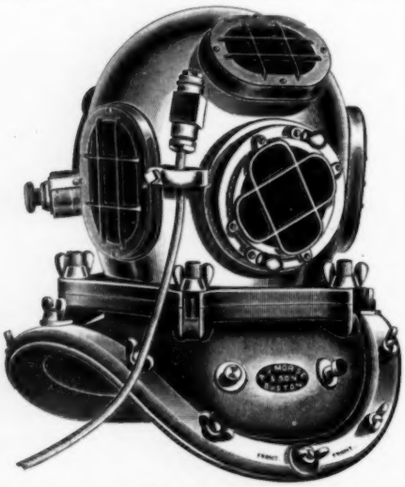
The pipe, it will be seen, extends upward, to allow it to be easily reached from over the wall, and has a flaring collar, as shown at F. A small offshoot, H, can advantageously be placed in the position shown. When the leader freezes place rock salt in the tube E and the pipe at F, and if convenient pour hot water into the pipe. Should the ice melt on the roof and the water flow into the tube E when the pipe is not open all the way down, the water can overflow at H and will not back up on the roof nor flow under the flashing C. If this precaution is taken the leader pipes can be kept open all winter.

An international amateur rowing race will be held at Cork, Ireland, July 21, 22 and 23. Lord Lieutenant O'Brien of Ireland will give a cup valued at $1,216, which is not a challenge cup, but is to be won "out and out."

The Submarine Diver and His Outfit

From data supplied by A. J. Morse & Co., Boston, Builders of Diving Apparatus for the U. S. Navy.)

With the screwing on of his brass helmet a diver hands his life over to the keeping of his attendant and the men at the air pumps. Sumarine diving is the hardest kind of work, requiring experience, skill, ingenuity and plenty of nerve. The occupation, however, is often exciting and commands good pay.



THE HELMET.

An outfit for diving in moderate depths includes the following articles: Air pump, $250; diving helmet, $100; 2 rubber dresses, $80; 150 feet air hose, $54; pair diving shoes with lead soles, $12; 2 pairs diving mittens, $10; 2 pairs diver's stockings, $2.50; pair sleeve expanders, $5; basket to pack helmet and suits in, $15, and numerous bolts, nuts, tools, etc.,

MORSE'S DOUBLE ACTION AIR-PUMP FOR SUPPLYING TWO DIVERS.

which bring the outfit up to $574. An outfit for very shallow work may be had for $375, while deep sea outfits cost $725, and up. This article will describe the dress and how a dive is made.

The diver having taken off his own clothes puts on a diver's flannel shirt, a pair of diver's drawers, carefully adjusted and drawn up outside the shirt, then his heavy stockings. If the water is cold he puts on two or even three suits of underclothes. If going into very deep water, cotton saturated with oil is put in the ears and a crinoline cap drawn down tightly over the ears. A pad is strapped on the shoulders to relieve the weight of the helmet and frame. He then gets into the diving dress, which in cold weather must first be warmed, drawing it

DIVER IN ARMOR.

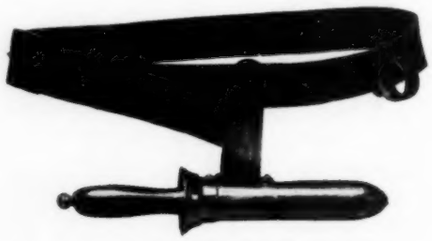
well up to the waist; an assistant opens the cuffs with the sleeve expanders, the diver pushing his hands through. He then puts on his canvas overalls to protect the rubber suit.

The diver now sits down, the inner collar of the dress is drawn tightly and tied with spun yarn, and the breastplate carefully put on. This is in two parts, between which the neck of the rubber suit is tightly clamped. The shoes, weighing 10 to 20 pounds each, are now put on and strapped. If rubber mittens

WEIGHTS ABOUT WAIST.

are to be used, they are next clamped to the cuff rings. He is now ready for the helmet, which is fastened with clamps or screwed on, according to the type of helmet. These helmets are made of tinned copper, with all mountings in finest gun metal, have three windows or lights of heavy plate glass, and are large enough to allow the diver to turn his head. In the Morse helmets, such as are furnished the navy, a safety valve prevents water coming into the helmet (and instantly drowning the diver) in case the air pipe is cut. An escape valve permits the air to flow out thus maintaining pure air for the diver. A safety lock prevents the helmet becoming accidentally unscrewed.

The helmet is now adjusted in place,



BELT AND KNIFE.

but the front plate is left off to admit air. The life line is next tied around the waist, brought up in front and secured with a bit of rope around the neck. The waist belt is buckled on with the knife on the left side, and the air hose screwed into the helmet. Two men are now ordered to "man the pumps." The diver steps on the ladder which extends a few feet down into the water and the weights are put over the shoulders.

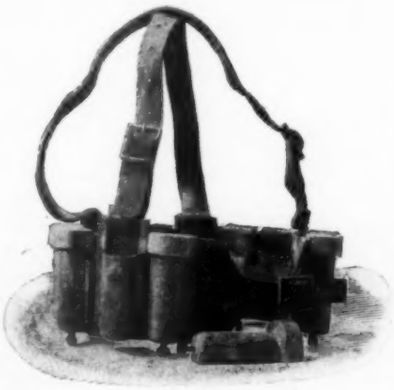
The attendant now makes a most careful and final inspection, and if everything is right, gives the word "Pump," and screws on the front plate. Air now begins to discharge through the escape valve in the helmet. He then takes the life line

LEAD SOLED SHOES.

in his hand and "pats" the top of the helmet with it, which is the order to the diver to descend. While the diver is below no laughing or talking is allowed, and the attendant must keep the life line in hand every instant. Some divers have a rope ladder reaching to the bottom, but experts prefer simply a rope heavily anchored as a guide down. After descending a few yards a halt is made to make sure everything is in proper working order. If he feels oppressed he must rise a yard or two, swallow his saliva several times and not go down until he feels comfortable. If oppression, headache or singing in the ears continues he must return

slowly to the surface. To dive to great depths, such as 120 or 150 feet, requires men of great practice and able to sustain the consequent pressure.

On arrival at the bottom he signals "All right," which is one pull on the life line. If he has to move away from the bottom of the ladder rope in thick water, he must carry a rope with him tied to the ladder rope to find his way back. If he loses his way, he must at once signal to be drawn up. In traveling on the bottom he must return by the same path he went to avoid getting his air pipe and life line fouled around some obstacle. Where a diving telephone is used orders are spoken after calling with a signal on the life line. One transmitter and receiver is fastened inside the helmet, and another set is beside the attendant. The telephone wires are inclosed in rubber and fastened to the life line. While the diver is down the attendant must frequently get an "all right" signal through the telephone or by the life line. If no answer is received the diver must be hauled up at once. In returning from great depths it is more important to rise slowly than in going down. The ascent from 120 feet should occupy five minutes in order to get accustomed to the great change in pressure from that depth to open air. Next week we will explain the symptoms a diver experiences, and describe some of the things he must and must not do.



REMOVABLE WAIST WEIGHTS.

Miss Mary Pangborn of Baltimore is traveling in Turkestan. At Bokhara she called on the Ameer and found him absent, whereupon she seated herself on his royal throne and had tea served to herself and party.

The New York University glee club startled Brooklyn by opening their grips and changing their shirts in a crowded trolley car a few nights ago. Many of the women passengers left the car.

PRISONER FREED BY AUTOMATIC EVIDENCE.

Automatic evidence proved the innocence of Joseph M. Mayer, charged with forging the name of the Chicago Telephone Company in Chicago. He was arrested on complaint of a saloonkeeper on whom a bogus check was passed. The saloonkeeper claimed that he was positive in his identification. Mayer works for the retail store of Marshall Field & Co. He testified in court that he did not leave the store until 5:30 o'clock, and hence could not possibly have reached the saloon at the hour the saloonkeeper claimed to have received the check. The judge adjourned the case and personally inspected the time recorder in the Field store. He found Mayer's statement confirmed, and the case was dismissed.

NOT THAT KIND OF A LINE.

Ex-Speaker Reed had occasion to consult with a political friend residing in some town out west, and telegraphed him to that effect. The railroad on which the friend had to travel had a serious accident and he telegraphed back:

"Can't come; washout on line."

The ex-speaker wired this reply:

"Get a clean shirt, and come anyway."

SOCIETY WOMAN IN TROUSERS.

Since Lady Constance McKenzie of Scotland appeared at the luncheon given in the lawn of Mrs. Richard Steven's residence in Aiken, S. C., wearing trousers, top boots and a riding coat, the wearing of trousers for field sports has become a fad among women in the East. Lady McKenzie was attired in full hunting costume. Many other prominent society women of the South and East were present. Among the men there were William C. Whitney, Capt. Woodbury Kane, Robert L. Stevens and W. Butler Duncan.

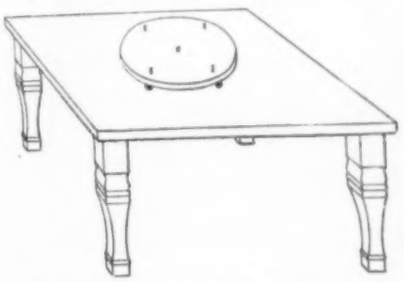
"HAY LOZENGES" FOR HORSES.

A Yankee has invented a kind of confectionery which is enjoyed by army horses in the Philippines and in South Africa. It is known as the "hay lozenge," and owes its existence to the necessity for providing transportation for food in the countries where the roads are bad. To make the lozenge, hay is compressed by machinery into discs from 12 to 18 inches in diameter and 2 inches in thickness. The discs are packed and rolled just as candy lozenges are, and are hung from the horse's back in slings. A single disc when cut open and loosened makes a good square meal for a horse for a mile.

What pies are placed on the table but never eaten?—Nappies.

TABLE FOR VARNISHING SASH.

A clever arrangement for holding window sash of street cars while being varnished is described in the Street Railway Review. It comprises a piece of ½-inch board circular in form and about 18 inches in diameter. To one side of this are fastened four small chair casters and in the other are inserted four small wooden pegs projecting upward about an inch. This circular piece is mounted upon a common table by means of a bolt passing loosely through holes bored in the center of the circular board and the top of the table. The pieces rests upon the four casters and is free to revolve about the bolt at the center. When a sash is to be varnished it is laid with the glass resting upon the four pegs. The painter stands at one side and as he varnishes each edge of the frame he turns the circular rest to bring the work immediately in front of him and does not have to move from his position. This not only saves time but is much more convenient for the painter and also assures better work with less risk of marring or scratching the side freshly painted.



CORRSION ENDANGERS SKYSCRAPERS

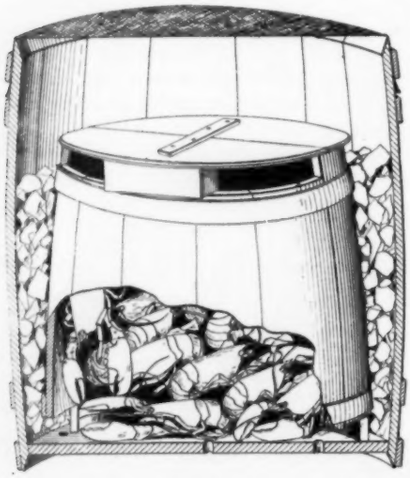
Sky scrapers are in danger of collapsing in a few years because of corrosion of the iron structures which form their foundation, according to a speech of General W. S. Smith before the Chicago Real Estate Board. He said:

"Wherever sulphurous fumes come in contact with iron and steel very rapid corrosion takes place—so rapid that in instances where locomotives run frequently under a steel structure the fumes escaping from the smokestack have injured iron beams and girders to such an extent that they were unsafe in less than five years. A notable example of that kind was in the approach to the Eads bridge in St. Louis. I presume similar instances could be found in Chicago if a little care was taken to look them up.

"Any attempt to cover steel with perishable paints to prevent corrosion are worse than useless. Common oil paint will lose its efficacy within five years; in the meantime keeping the concrete from contact with the steel and so robbing the steel of the protection the lime in concrete would give."

COLD STORAGE SHIPPING CRATE.

The cut explains the shipping crate recently patented for shipping fish, lobsters, etc. It consists of one tub within another



with ice between and on top. The fish are put in the inner case without any ice. Air spaces permit circulation of air, and small holes in the bottom keep the water drained.

AMAZING PERFORMANCE OF TRAINED FLEAS.

The latest addition to the many attractions of Berlin is a flea circus. It is necessarily of small dimensions and everything pertaining to it is small. It is wonderful what the flea performers can do. They draw miniature carriages, set lilliputian "flying Dutchmen', moving, dance ballet and go through the evolution of fencing with tiny swords. The circus can be viewed to the best advantage through a microscope.

The training of the flea is not an easy matter. One method is to put the insect between two glass plates which are so close together that every time it tries to jump it runs its head against the upper plate. Finally it ceases to make any attempts to jump. Once it is broken of this inherited habit the rest of the training is made much easier.

The feeding of the animal is done by the manager of the show, who bares his arm, puts the flea on it and they eat his blood.

KINGS AND QUEENS WEAR IRISH HOMESPUN.

The demand for Irish homespuns among the kings and queens of Europe has infused new life into the towns of Donegal and Connemara, Ireland. In the little thatched cottages here the old-fashioned spinning wheels, many of them centuries old, have been dusted, and fingers that had almost forgotten the work are growing expert again. A cottage owning a loom may always be known by its unusual length. The machines used in manufacturing the homespun are amazingly crude in appearance, but the fabric they produce cannot be equalled by the most perfectly equipped factory with the finest machinery that skill of man has ever devised. On one of these looms was woven the Irish linen presented to Queen Victoria on the occasion of her jubilee in 1887. The linen was said to be the finest ever manufactured. The looms are handed down from one generation to another and the secret of their age belongs to the workers of another time.

THE MYSTERIOUS LIVES OF BIRDS.

Science has never been able to explain the mysteries of the lives of birds. Herr Gatka has added another problem in discovering that birds in migrating always travel with perfectly empty stomachs. Olive Thorne Miller says: "The remarkable feat of sinking the body in water to any desired depth and holding it there without motion and without clinging to anything is another unexplained secret. Geese, ducks, sandpipers and cormorants are all experts in this maneuver. We smile at the idea of a sea bird, which is as much at home on the water as on land, either needing or wishing to ride, yet the tropic bird is said to occasionally vary his wing exercises by alighting for a sail on the back of a tortoise which he finds lazily floating on the surface. Major Bendine tells of a little owl caught riding on the back of an unwilling gopher, with the air of such composure that the observer was convinced it was a common exploit of the bird.

BASKET FOR TRANSPLANTING PLANTS.

People who have to grow plants will catch the idea of a Maryland man who has devised a wire basket, which is set in earth

and the seed or slip planted in it. When the time to transplant arrives, the basket with its contents can be removed without injury to the roots of the plant.

Wireless telegraphy has been successfully tested on the Great Lakes. The steamer City of Detroit sent and received messages between Detroit and Cleveland and between Cleveland and Buffalo.

FOR THE MADAM

HOW TO PREPARE POTATOES.

Lyonnaise potatoes—One quart of cold boiled potatoes cut into dice; three tablespoonfuls of butter, one of chopped onion, one of chopped parsley, salt, pepper. Season the potatoes with the salt and pepper. Fry the onions in the butter, and when they turn yellow add the potatoes. Stir with a fork, being careful not to break them. When hot, add the parsley, and cook two minutes longer. Serve immediately on a hot dish.

Note.—This series of articles on the methods of preparing potatoes began with the March 29 issue.

DOES WATER PRODUCE FAT?

No, of course not. Water contains none of the elements from which fat is produced. There is a notion abroad that people who drink much water are liable to get fat, says Medical Talk. In consequence of this notion a great many people who think themselves too fat are denying themselves water and other fluids. A great many other people who think they are not fat enough are swilling down water hoping to get fatter. This is all bosh. Perfectly absurd. There are people who will get fat in spite of drinking water. There are people who will get lean in spite of denying themselves water. But as far as water has any effect in the production or elimination of fat, its effect is to make people leaner.

HOW TO PRESERVE EGGS.

The efficacy of saturated lime-water for preserving eggs has been well demonstrated by experiments conducted by the Canadian Ministry of Agriculture. Numerous other alleged preservatives were tried but none gave anything like the good results of the lime-water. The eggs were left in the solution for more than six months. The outward appearance was excellent; yolks non-adherent, of good color and fairly globular; albumen somewhat more limpid than in fresh eggs and slightly discolored; very slight stale odor; air space normal; poached eggs free from all objectionable taste and of good appearance. Other preservatives tested with less satisfactory results were: lime-water plus 10 per cent of common salt; 10 per cent solution of water glass (sodium silicate); 5 per cent glycerine, and distilled water.

Miss Mrytle O'Neill, a music teacher living near Atchison, Kas., has just ended a twenty-six day fast, which, she says, was done to purify her soul and character.

APRIL 1902

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BANQUET OF HORSEFLESH.

Horseflesh was the principal dish at a recent banquet in Paris. A Parisian journal in commenting on the meat remarked that it is an unreasonable prejudice that exists against horseflesh while people voraciously devour pork, which is the flesh of the most unclean of animals, and mackerel, which is the scavenger of the seas.

SAY "HELLO" IS VULGAR.

Evanston, the classic suburb of Chicago, has ruled that it is vulgar to say "hello" when you take down the telephone receiver. Instead you must say "good morning," "good afternoon" or "good evening." Only servants are permitted to say "hello." Evanstonians expect the new rule to become universal.

MAY USE AMERICAN CABLES.

The government of the Netherlands has submitted to the states general at the Hague a telegraphic convention with Germany, providing for a joint subsidy for cables to the Dutch colonies in the far east. It is proposed to connect the islands of Menado and Celebes (in the East Indies) with the American Philippine cable, which will be connected with Shanghai. The importance of the convention lies in the fact that communication will thereby be established with Europe via America by cables belonging to various nationalities.

STRANGE BEDFELLOWS.

Little Tommie had been put to bed alone. It was upstairs, and the thunder rolled and lightning flashed unmercifully. He lay quietly until he could no longer stand it, and then his little nightgowned figure appeared at the head of the stairs.

"Ma!" he cried.

"Yes, my son," came the calm rejoinder.

"I'm afraid, ma. It thunders so, and I'm all alone."

"Go back to bed, Tommie," came his mother's voice. "Don't you know nothing can hurt you?"

Tommie went back to bed, but not to stay.

"Ma!" he cried again, and this time the little figure was half-way downstairs.

"Tommie," called his mother, "don't you know I have told you nothing can hurt you, God is always with you."

"Then, ma," and this time there came an audible sniff from the weeping Tommie, "you come up and sleep with God and let me sleep with pa."—Lippincott's Magazine for April.

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Attractions for Next Week.

When it is great Popular Mechanics will tell about it. No matter if it be in Hong Kong or Kankakee, Cape Cod or Kalamazoo.

Would you like to know about the Turkish Harem as it is today? Electricity and modern mechanics has worked wonders in this famed abode of the Sultan. Abdul Hamid and his 300 wives now talk with each other over the telephone; he can summon any of these to him by merely touching a call bell; the place is equipped with electric lights, hot water, gas, baths and all the improvements of a modern American mansion; the sultanas have their gowns made in Paris, dress in the latest French fashions and read French novels. Popular Mechanics has an interesting article about it next week.—Paper stockings are the latest.

There is just one woman harnessmaker in the world. She lives in Chicago. Read about her next week.—"Famed Poisons of Ancient Days" is in next week's issue. There were the poison rings of Pompeii, whose touch to food or drink would cause death; tasteless, colorless, odorless poisons, the action of which could be timed so as to produce death in days, months or years, as the poisoner desired.—Did you know that certain crimes are peculiar to certain seasons of the year? Poisonings, for instance, are nearly always in May; murders in August, January and June, and thefts in January and February.—The Chinese used to be able to tell the time of day by looking at the eyes of a cat.—A man out in Arizona has a scheme to wipe consumption from the land by causing people to drink goat's milk.—A New York man has invented a hen house which he claims will make hens lay. These are only a few of the half a hundred articles about people and things everywhere in next week's Popular Mechanics. The world is its field.

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